IN THE CLAIMS:

1. (Original) A neural spike detection system, comprising:

   (a) a signal receiver operable to receive a plurality of neural signals comprising a neural spike;

   (b) a neural spike detector adapted to communicate with the signal receiver and detect the neural spike in the plurality of neural signals; and

   (c) a transmitter in communication with the neural spike detector and operable to transmit an information signal when a neural spike is detected.

2. (Original) The system of claim 1 wherein the system is an implantable neurochip comprising very large-scale integration architecture.

3. (Original) The system of claim 1 wherein the neural spike detector comprises a remote device and communicates with the signal receiver via a wireless link.

4. (Original) The system of claim 3 wherein the wireless link comprises radio frequency telemetry.

5. (Original) The system of claim 3 wherein the wireless link comprises ultra wideband radio telemetry.

6. (Original) The system of claim 3 wherein the wireless link comprises optical telemetry.

7. (Original) The system of claim 3 wherein the remote device is adapted to be worn by a subject.

8. (Original) The system of claim 1 wherein the signal receiver includes a plurality of neural sensors for detecting neural signals from neurons.

9. (Original) The system of claim 8 wherein the plurality of neural sensors comprise electrodes.

10. (Original) The system of claim 8 wherein the plurality of neural sensors comprise magnetic field detectors.

11. (Original) The system of claim 8 wherein the plurality of neural sensors comprise chemical sensors.

12. (Original) The system of claim 1 wherein the signal receiver comprises amplifiers operable to amplify the plurality of neural signals.

13. (Original) The system of claim 12 further comprising a control module adapted to selectively power the amplifiers for conserving power.

14. (Original) The system of claim 12 further comprising a control module adapted to selectively control the amplification of the amplifiers.

15. (Original) The system of claim 12 wherein the amplifiers are operable to amplify the neural signals to a level of between about 90 and about 100 decibels.

16. (Original) The system of claim 1 wherein the signal receiver comprises filters operable to filter predetermined frequencies in the plurality of neural signals.

17. (Original) The system of claim 16 wherein the filters are adjustable to filter different frequency ranges.

18. (Original) The system of claim 17 further comprising a control module adapted to selectively adjust the frequency ranges filtered by the filters.

19. (Original) The system of claim 16 wherein the filters are operable to filter frequencies between about 500 and about 10,000 hertz.

20. (Original) The system of claim 1 further comprising:

(a) a multiplexer comprising an output and one or more inputs connected to neural sensors for selecting a neural signal as a reference signal as the output; and

(b) a plurality of operational amplifiers having first and second inputs, wherein the neural sensors are connected to the first inputs of the operational amplifiers and the second inputs are connected to the output of the multiplexer for providing a difference signal between the neural signals of the neural sensors and the reference signal.

21. (Original) The system of claim 20 further comprising a control module adapted to selectively control the multiplexer for outputting the neural signal as the reference signal.

22. (Original) The system of claim 20 further comprising one or more analog-to-digital converters connected to the operational amplifiers for converting the difference signal to a digital representation.

23. (Original) The system of claim 1 further including preamplifiers comprising operational amplifiers for filtering neural signals.

24. (Original) The system of claim 18 wherein the preamplifiers include:

(a) an operational amplifier having a first and second input and an output, wherein the first input is connected to a neural sensor; and

(b) a resistor connected between the output and the second input of the operational amplifier.

25. (Original) The system of claim 24 wherein the preamplifier further includes a capacitor connected between the second input of the operational amplifier for reducing DC offset in the neural signal.

26. (Original) The system of claim 25 wherein the capacitor and operational amplifier are manufactured on a first and second integrated circuit, respectively.

27. (Original) The system of claim 1 further comprising a multiplexer for selecting neural signals for transmission.

28. (Original) The system of claim 27 further comprising a control module adapted to selectively control the multiplexer for outputting the neural signals for transmission.

29. (Original) The system of claim 1 wherein the neural spike detector includes very large-scale integration architecture.

30. (Original) The system of claim 1 wherein the transmitter includes an encoder for encoding the information signal.

31. (Original) The system of claim 1 wherein the information signal is a digital signal.

32. (Original) The system of claim 1 wherein the transmitter transmits a pulse when a neural spike is detected in one of the plurality of neural signals.

33. (Original) The system of claim 1 wherein the transmitter transmits a first and a second pulse when a neural spike is detected on one of the plurality of neural signals, the two pulses being time-spaced by a predetermined length of time for indicating on which of the plurality of neural signals that the neural spike was detected.

34. (Original) The system of claim 1 wherein the information signal is a time multiplexed analog signal.

35. (Original) The system of claim 1 wherein the neural spike detector isolates neural spikes from noise sources by employing differential recording.

36. (Original) The system of claim 1 wherein the neural spike detector isolates neural spikes from noise sources with filtering and differential recording.

37. (Original) The system of claim 1 wherein the transmitter comprises a radio frequency transmitter.

38. (Original) The system of claim 1 wherein the transmitter comprises ultra wide band radio.

39. (Original) The system of claim 1 wherein the transmitter is implantable into a subject and further includes transcutaneous telemetry for transmitting the neural spike detection signal outside the subject.

40. (Original) The system of claim 1 further including a controller connected to the neural spike detector and operable to output control signals in response to detected neural spikes.

41. (Original) The system of claim 40 wherein the control signals are transmitted to a mechanical device.

42. (Original) The system of claim 1 further including an indicator connected to the neural spike detector and operable to transmit a sensory signal indicating detection of a sensory input.

43. (Original) The system of claim 42 wherein the sensory input is one of touch, sound, light, and chemical stimuli.

44. (Original) The system of claim 1 further comprising a wireless power receiver adapted to wirelessly receive power from a wireless power transmitter for powering the system.

45. (Original) The system of claim 44 wherein the wireless power receiver is adapted to receive a clock signal with the power from the wireless power transmitter.

46 - 56. (Canceled)

57. (Original) A method for transmitting a neural spike signal, comprising:

(a) receiving a neural signal comprising neural spikes;

(b) detecting occurrences of neural spikes in the neural signal; and

(c) transmitting an information signal indicating the occurrence of a neural spike when a neural spike is detected.

58. (Original) The method of claim 57 comprising amplifying the neural signal.

59. (Original) The method of claim 58 comprising controlling the amplification of the amplifiers.

60. (Original) The method of claim 57 comprising filtering predetermined frequencies of the neural signals.

61. (Original) The method of claim 60 comprising selecting the frequency ranges for filter.

62. (Original) The method of claim 57 comprising selecting a one of the neural signals as a reference signal for providing a difference signal between the neural signals and the selected neural signal.

63. (Original) The method of claim 57 comprising receiving a wireless power signal from a wireless power transmitter for powering the system.

64. (Original) The method of claim 63 comprising transmitting a clock signal on the power signal.

65 - 82. (Canceled)